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ABSTRACT

This document provides 12 sketches or profiles of Management Information Systems (MIS) application. As a result of the 1973 preliminary Information Exchange Procedures (IEP) field test, some 45 colleges and universities across the nation developed compatible unit cost data and related information and compared themselves with one another. Twelve representative campuses were contacted to find out how planners and managers on those campuses made use of the newly available information. Emphasis was placed on three questions: (1) What specific portions of the information or data items were most useful? (2) Who used the data? (3) What specific decisions were affected or what actions resulted? Each of the 12 institutions that contributed to this document developed the same standard set of new data, used the same NCHEMS software packages in the process, and developed the same new analytic capabilities. Some of the more important new data developed and published by the institutions are: direct cost per credit hour by discipline by level of instruction, full cost per credit hour by discipline by level of instruction, number of credit hours produced per FTE teaching faculty by discipline by level of instruction, number of exchange FTE student majors by degree program by student level, direct annual cost per exchange FTE major by degree program by student level, full annual cost per exchange FTE major by degree program by student level, and total direct expenditures displayed by subprogram of the NCHEMS Program Classification Structure. (Author/MJM)

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PROFILES OF MANAGEMENT INFORMATION USES

U.S. DEPARTMENT OF HEALTH EDUCATION & WELFARE NATIONAL INSTITUTE OF EDUCATION

A Report on How Twelve Institutions Have Utilized Data From NCHEMS Management Information Systems

Robert A. Huff

Michael E. Young

HE 005 557

May, 1974

WESTERN INTERSTATE COMMISSION FOR HIGHER EDUCATION

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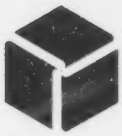

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. . . to expand the supply of specialized manpower in the West.

. . . to help universities and colleges improve both their programs and their management.

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To design, develop, and encourage the implementation of management information systems and data bases including common data elements in institutions and agencies of higher education that will:

- provide improved information to higher education administration at all levels.
- facilitate exchange of comparable data among institutions.
- facilitate reporting of comparable information at the state and national levels.

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INTRODUCTION

The work of the National Center for Higher Education Management Systems over the past five years has been directed toward the development of new tools and techniques that provide new types of information to serve the educational management and decision-making process. Although there have been many prognostications about the utility or lack of utility of certain new information items, until now there has been little hard evidence to shed light on exactly how the new information would be applied. During 1973 the first sizable group of NCHEMS participating institutions undertook an extensive field test of major NCHEMS products, including a preliminary set of Information Exchange Procedures. Thus, for the first time it has become possible to return to the scene of some of those pilot implementations and very pointedly ask "What did you do with the new data and information your campus produced?"

The purpose of this document is to provide the reader with 12 sketches or profiles of Management Information Systems (MIS) application. As a result of the 1973 preliminary IEP field test, some 45 colleges and universities across the nation developed compatible unit cost data and related information for the first time and compared themselves with one another. NCHEMS staff have contacted 12 representative campuses from this group in an attempt to find out how planners and managers on those campuses made use of the newly available information. Institutional representatives were asked:

(1) What specific portions of the information or data items were most useful?

(2) Who used the data?

(3) What specific decisions were affected or what actions resulted?

The responses to these questions are contained in 12 profile statements that have been examined and edited for accuracy by the individual institutions. NCHEMS is extremely appreciative of the cooperation the institutions have shown in helping develop this document and for their willingness to share their experiences and perceptions related to MIS application with others. The 12 participating institutions include:

State University of New York--Plattsburgh

Saint Joseph's College (Indiana)

Community College of Philadelphia

Mansfield State College (Pennsylvania)

Rider College (New Jersey)

Georgia Institute of Technology

New Mexico Junior College

University of North Dakota

University of Wisconsin--LaCrosse

County College of Morris (New Jersey)

University of Northern Colorado

University of New Mexico

NEW INFORMATION AND CAPABILITIES

Each of the 12 institutions that contributed to this document developed the same standard set of new data, used the same NCHEMS software packages in the process, and developed the same new analytic capabilities. Some of the more important new data developed and published by the institutions are:

(1) direct cost per credit hour by discipline by level of instruction (discipline direct unit costs)

(2) full cost per credit hour by discipline by level of instruction (discipline full unit costs)

(3) number of credit hours produced per FTE teaching faculty by discipline by level of instruction (faculty productivity ratios)

(4) number of exchange FTE student majors by degree program by student level

(5) direct annual cost per exchange FTE major by degree program by student level (program direct unit costs)

(6) full annual cost per exchange FTE major by degree program by student level (program full unit costs)

(7) total direct expenditures displayed by subprogram of the NCHEMS Program Classification Structure.

These and other data from each individual school were published in a document that was exchanged with all other institutions participating in the IEP field test. The formats in which the seven data items listed above were displayed and exchanged are shown below in Tables 1, 2, and 3. It is important to note that in addition to the new historical information

the 12 campuses had available during 1973, they also had new analytic capability due to having implemented the Induced Course Load Matrix (ICLM) and Resource Requirements Prediction Model (RRPM) software packages. With the ICLM and RRPM, each institution has a simulation capability intended for use during the planning and budgeting process.

Table 1

STATE UNIVERSITY OF NEW YORK AT PLATTSBURGH
Plattsburgh, New York

INSTRUCTIONAL DISCIPLINE COSTS
ACADEMIC YEAR 1972-73

(Fall and Spring Semesters)

Discipline Title	Number of Credits	Direct Cost Per Semester Credit	Full Cost Per Semester Credit	FTE Faculty to Credit Hour Ratio
Administrative Science (0506)				
Lower Division	1,533	$ 22	$ 38	1 to 1,111
Upper Division	1,255	16	29	1 to 1,589
Anthropology (2202)				
Lower Division	3,405	17	31	1 to 1,091
Upper Division	1,257	36	59	1 to 590
Art (1090)				
Lower Division	4,914	39	64	1 to 531
Upper Division	1,550	52	85	1 to 369
Graduate Division	7	236	357	1 to 117
Astronomy (1911)				
Lower Division	747	37	61	1 to 508

Table 2

GEORGIA INSTITUTE OF TECHNOLOGY
Atlanta, Georgia

INSTRUCTIONAL PROGRAM COSTS
FISCAL YEAR 1972-73

(Summer, Fall, Winter, and Spring Quarters)

Program Title	No. of Exchange FTE Majors	Quarter Credit Hrs. Definition of Exchange FTE Majors	No. of Quarter Credit Hrs. Req. for Graduation	Direct Annual Cost Per Exchange FTE Major	Full Annual Cost Per Exchange FTE Major
Aerospace Engineering					
Lower Division	137	45		$ 814	$1,247
Upper Division	108	45	201	1,414	2,019
Graduate-1	51	36	33/50	2,821	3,819
Graduate-2	55	36	80	3,344	4,502
Architecture					
Lower Division	379	45		861	1,310
Upper Division	212	45	271	1,679	2,386
Graduate-1	11	36	33/50	1,607	2,259
Chemical Engineering					
Lower Division	208	45		954	1,428
Upper Division	193	45	206	1,511	2,145
Graduate-1	28	36	33/50	4,728	6,291
Graduate-2	19	36	80	5,144	6,835
Chemistry					
Lower Division	99	45		816	1,250
Upper Division	72	45	199	1,061	1,574
Graduate-1	32	36	33/50	3,439	4,648
Graduate-2	74	36	80	3,644	4,915

Table 3

UNIVERSITY OF NEW MEXICO
Albuquerque, New Mexico

INSTITUTIONAL DIRECT EXPENDITURE DISPLAY -- 1972-73

NCHEMS PROGRAM CLASSIFICATION STRUCTURE		TOTAL DIRECT EXPENDITURES
1.1	General Academic Instruction	$14,089,611
1.2	Occupational and Vocational Instruction	
1.3	Summer Session Instruction	658,789
1.4	Extension Instruction	47,902
2.1	Institutes and Research Centers	8,180,178
2.2	Individual or Project Research	3,861,234
3.1	Community Education (see 1.4, Extension and Continuing Education)	286,517
3.2	Community Service	4,172,104
3.3	Cooperative Extension Service	
4.1	Libraries and Audio-Visual Services	1,622,831
4.2	Museums and Galleries	201,986
4.4	Computing Support (Instructional)	950,446
4.5	Ancillary Support	24,536
4.6	Instructional Deans and Personnel Development	1,381,900
4.7	Course and Curriculum Development*	
5.1.7100	Student Development	964,143
5.1.7200	Intercollegiate Athletics	1,158,917
5.2	Supplementary Educational Services	187,006
5.3	Counseling and Career Guidance	178,363
5.4.0050	Financial Aid Counseling	70,280
5.4.0060	Work-Study and Student Employment**	30,000
5.5	Student Support	5,551,943
6.1.8110	Executive Direction	388,749
6.1.8130	Legal Services	34,041
6.2	Fiscal Operations	502,174
6.3.8160	Management Systems and Data Processing	607,554
6.3.8220	Student Admissions and Records	495,591
6.3.8230	Employee Personnel and Records (includes non-instructional staff benefits)	583,003
6.4	Logistical Services	2,211,282
6.5	Physical Plant Operations	2,948,727
6.6	Faculty and Staff Services	9,561
6.7	Community Relations	250,925
	TOTAL	$51,650,293

*Total Direct Expenditures are unidentifiable and included in 1.1.
**Total value of loans, scholarships (including athletic scholarships), and stipends is approximately $2.6 million.

The instituional sketches in this document depict IEP data being used for both internal (intracampus) and external management purposes. Internally, IEP data have been used to assist in resource allocation (see SUNY-Plattsburgh), curriculum development and modification (see Saint Joseph's College), union contract negotiations (see Community College of Philadelphia), and in development and modification of operational data systems (see Rider College). In addition, IEP data and the process of collecting it alter and improve the internal planning and consensus-making process. Deans and department chairpersons became more involved in the planning and management of their organizational units (see the University of North Dakota and SUNY-Plattsburgh). Furthermore, managers from department chairpersons to the top levels of the institution begin to plan and think in terms of degree programs and begin to view departments as organizational units that provide services in the form of instruction to students housed in the degree programs (see Mansfield State College).

External uses of IEP data include budget preparation and cost justification to the governing board (see Georgia Institute of Technology, County College of Morris, and University of Wisconsin--LaCrosse), accreditation self studies (see New Mexico Junior College), and inputs to the establishment of reporting and funding practices and improved credibility with various agencies (see University of New Mexico and the University of Northern Colorado).

It is hoped that those who read this document will be able to relate the planning and management situations depicted on the 12 capuses to their

own institutional settings. The management problems and decisions upon which the new information and analytic capability were brought to bear certainly do not appear to be unique. Perhaps through perusal of the following 12 MIS application profiles, administrators of other colleges and universities will be able to assess better whether adoption of new management tools and practices will be of significant benefit in their unique institutional environments.

STATE UNIVERSITY OF NEW YORK--PLATTSBURGH

The motivation for developing unit cost figures and other management information at SUNY-Plattsburgh was simply a desire on the part of President George Angell to use any opportunity to improve management practices on the campus. Since there were no common "yardsticks" with which to measure the various departments and faculties, deans and department chairmen were never quite sure if they were getting their fair share of the college's budgeted resources. If more and new kinds of information could be made available, President Angell saw a possibility of encouraging deans and department chairmen to become more effective managers of their own resources. In effect, he hoped to push many internal resource allocation decisions down to the department level and avoid having micro decisions related to awarding tenure to specific individuals, allocating department funds for secretaries, travel, and so forth, passed up to his office. Dr. Angell's hope was that the chief executive officers of SUNY-Plattsburgh could operate at the macro decision-making level, setting tenure guidelines, workload targets, and funding patterns for each division or department. Then, it was hoped, deans and department chairmen could receive lump sum internal budgets with few strings attached and would be free to manage those resources as they thought best so long as they stayed within the guidelines and targets developed in

consultation with the president's office.

Reports containing cost per credit hour for each discipline and course level and cost per FTE student fo each degree program and student level were given to deans for the first time during the fall of 1973. The reports contained additional data about department student/teacher ratios and contributions of each department to various degree programs. The deans initially were somewhat alarmed by these reports and questioned their validity. Since the deans and faculty were suspicious of part of the data base used to derive the unit cost figures, they were asked by President Angell and William Dempsey, Assistant to the President (who organized the data collection effort), to check and adjust the cost study data base until they felt satisfied with the inputs to the cost study. After this was done, a new set of reports was generated and subsequently received with a much higher degree of credibility by the deans and faculty.

The availability of comparative unit costs and other data led to a comparison of all academic departments and degree programs by academic administrators. Lists displaying disciplines and degree program unit costs from high to low were developed and shared. It naturally followed that certain departments and degree programs were identified for closer scrutiny because of their higher or lower than expected unit cost. A

significant problem arose in that administrators wished to compare the unit costs of their programs with similar programs at similar institutions. Such comparable unit cost figures were not readily available and the only comparisons that could be made were among unlike disciplines and degree programs within the institution.

The prompt response to questions about the relative high cost of certain programs and disciplines was that those were high quality areas and, thus, were justified. Next, questions about relative quality of programs led to development and acceptance of a plan to gather systematic program evaluations from students, alumni, and employers. This endeavor might not have found faculty acceptance had it not been for the faculty's new desire to balance unit cost information with assessments of quality.

President Angell identified the faculty productivity ratios (the number of credit hours produced by each FTE faculty member teaching at a given course level within a given discipline or department) as an extremely important operational parameter. Graphs were prepared showing the relative credit hour productivity per FTE teacher for each department and course level. Through negotiations with deans, the President established new productivity ratio targets for each division or faculty within the institutions. These targets were intended to guide staffing decisions in the future. Examples of the productivity ratio targets follow.

		Credits Produced Per FTE Teaching Faculty	
		Actual 1971-72	1977-78 Target
Social Science Faculty	Lower Division	890	820
	Upper Division	586	600
	Grad. Division	290	400
Science and Math Faculty	Lower Divsions	600	590
	Upper Division	314	450
	Grad. Division	113	288

The deans of each faculty division were free to allow variance as they deemed desirable among the various departments within their divisions so long as the overall result was attainment of the specified division targets. A desire to budget and manage resources by degree programs that produce graduates, as opposed to traditional discipline-oriented departments, has led to a new innovation at SUNY-Plattsburgh. The Faculty of General Studies, headed by Dean Nicholas Troisi, is a new division with a budget but no faculty or courses of its own. Dr. Troisi is a degree program manager as opposed to a discipline or department manager. Student demands for new programs are met by tailormaking new curricula. In doing this, Dr. Troisi works with the existing departments and negotiates with these traditional organizational units for courses that complete each new General Studies degree program. Each curriculum is approved by the Faculty Senate, but the courses that comprise the curriculum may be offered where the content and quality

are perceived to be best in terms of the needs of the students. Academic administrators must have up to date unit cost data and supporting operational parameter information for this flexible degree program management to operate efficiently.

SAINT JOSEPH'S COLLEGE

During the fall of 1973 the Academic Cabinet at Saint Joseph's College in Rensselaer, Indiana, was given a summary of unit costs and faculty productivity ratios for each discipline at each course level. Each Cabinet member was asked by Dr. Robert J. Garrity, Vice-President for Academic Affairs, to consult with the department chairman in his or her division about ways to improve relatively low faculty productivity ratios, where applicable. Several of the departments took this assignment quite seriously and were concerned about "not showing up well" in the departmental comparisons. The Music Department, among the most expensive in the college, has made several internal adjustments in teaching assignments to improve productivity and to lower unit costs.

After careful examination of all the data, the chairman of the Physics Department proposed to the Academic Cabinet that physics be dropped as a major and become only a minor field of study. Since there had been only a small number of physics majors who were requiring several specialized courses that had to be taught with very small class sizes, it is understandable that the Physics Department had appeared quite expensive. By offering mainly service courses as part of the core curriculum of the college and eliminating the highly specialized courses intended only for majors, the Physics Department hopes to attract many more students and remain a viable academic unit.

In mathematics and several other disciplines, faculty at Saint Joseph's are planning to cycle some courses that have regularly been offered to small groups of students. This would mean that these courses would be offered only every two years instead of annually. Class size should increase and faculty time could be used more efficiently. Thus, these disciplines would improve their efficiency without damage to the curriculum and free faculty time for new instructional assignements.

The greatest change at Saint Joseph's College due to the availability of new kinds of management information has come at the department level. Chairmen and faculty are finding there is nothing terribly esoteric about unit cost data and comparative productivity ratios. They have found, however, that the new information gives new clarity and focus to their planning and management decisions and allows them to understand the implications of their decisions. Dr. Garrity has said, "We are no longer arguing on the basis of hearsay. We now know a great deal about what different choices mean."

COMMUNITY COLLEGE OF PHILADELPHIA

In 1972 Community College of Philadelphia implemented the NCHEMS Cost Estimation Model and the following year replaced it with the RRPM 1.6. An important initial use of those simulation models on the campus was during contract negotiations with the faculty union. Dr. Richard Spencer, Assistant to the President, indicates that administrators found a simulation model useful in two ways during collective bargaining. First, the college anticipated many of the demands related to workloads, salaries, fringe benefits, and so forth, that the union representatives were likely to put forth and simulated the financial impact of each proposal ahead of time. This provided the administration with substantial understanding of which proposals were the most cost sensitive and hence would require closest scrutiny. The fact that prior simulations of the initial union proposals had been run allowed a significant quickening of the negotiation process and highlighted the key issues.

A second utilization of the simulation model was during the actual negotiations themselves. New union proposals related to staffing patterns, workloads, and so forth, could be rolled forward by means of an overnight computer run or within a matter of days to assess not only the immediate budgetary impact but also the effect three years in the future. Thus, decisions that might appear acceptable at the current time could be analyzed more completely relative to the long range impact of trends

they would set in motion. A very important use of the model during negotiations was in analyzing trade-offs between such parameters as work loads and salaries. The administrators and union representatives could, through the use of the simulation model, negotiate combinations of parameter changes with a good understanding of the financial effect of those multiple changes. In this way, the model served both sides of the negotiating table and gave objectivity to what might have been only subjective judgments and emotional arguments.

Community College of Philadelphia also has made considerable use of comparative unit cost information and simulation modeling techniques during its internal planning processes. President Allen T. Bonnell and Provost Raymond A. Pietak have hoped to make the division directors and department heads more conscious of the resource consumption attendant to their planning decisions. Through a standard cost study and resource utilization analysis, the college has provided an additional management tool to assist decision making.

All curriculum planning for new programs at the Community College of Philadelphia is now done with the assistance of the RRPM. Each proposal for a new or altered degree program is input to the model and simulated to assess the overall cost and impact on staffing in the various departments, and so forth. For example, in 1973 the Music Department

faculty developed a new degree program curriculum proposal using the model. The model outputs assisted the Music Department in defending its proposal before both faculty committees and administrators, and the proposal eventually was adopted.

Community College of Philadelphia was opened in 1965 and still is experiencing enrollment growth. Use of the RRPM has enabled curriculum planners to understand that enrollment growth does not necessarily translate into an equally distributed or linear budget growth for all departments.

Community College of Philacelphia currently is analyzing and comparing its unit costs in disciplines and degree programs with eight similar community colleges that have developed cost figures using the standard NCHEMS definitions and procedures. The college has found that while its unit costs in some degree programs, such as accounting and physical science, are very similar to those in the other eight institutions, several programs, including architectural technology and chemical technology, are considerably more expensive at Philadelphia than on the other campuses. Each of the exceptional cases is being analyzed. In some cases the responsible administrative personnel are contacting the other campuses in order to ascertain why the variance in unit costs exists. After establishing the exact reasons for the higher than typical costs in these programs, college personnel will determine if each inci-

dence of high cost is desirable or justifiable. The college intends to be ready to explain the way in which it has chosen to allocate and utilize its resources should it have specific program costs challenged in the future.

Dr. Spencer sums up the Community College of Philadelphia experience to date by saying, "All of this new information and capability is a very positive force rather than a negative force. The college has come to the realization that improved planning and budgeting practices ultimately benefit all concerned parties, including students, the local community, and the faculty."

MANSFIELD STATE COLLEGE

Over the past two years a substantial move toward program planning and budgeting has occurred at Mansfield State College in Pennsylvania. Faculty, administrators, trustees, and regional personnel have become increasingly involved in the entire planning and budgeting process by virtue of their activities on an institutional planning commission. The Mansfield planning commission is charged with reviewing all current degree programs and recommending additions, alterations and deletions. Dr. George Miller, Vice-President for Administrative Affairs, indicates that the planning commission has drawn heavily on data such as standard per student major costs and the Induced Course Load Matrix in assessing degree program health and prospects.

The commission has produced a document recommending future program trends for the institution. The document indicates that four specific degree programs are being questioned relative to their continuation, while certain others should actively pursue growth. Also, it has been indicated that certain departments that service the various changing degree programs must be preparing for changes in numbers of faculty and courses offered. The student recruiting efforts of Mansfield State now are being concentrated on those degree programs in which increased enrollments are deemed most important to the overall campus plan.

Degree program planning now leads departmental planning at Mansfield State College. First, a package of degree programs with target enrollments in constructed. Then, using the ICLM to determine the impact of those degree programs on certain disciplines, the various department budgets are constructed. This is necessarily an iterative process since constraints and unique situations within particular departments must be accommodated. The important thing is that the driving force behind the planning process is a concern for the demands of students in degree programs for courses, as opposed to a concern for the wishes of the individual departments and faculty to offer certain courses and activities.

Mansfield State has participated with the other 13 Pennsylvania State Colleges in developing a capability for program planning and budgeting. They have shared what they learned in working with NCHEMS tools and approaches as well as some techniques and software developed by their own staff. Consequently, meaningful unit cost comparisons now are available among all 14 of the state colleges in Pennsylvania.

The fiscal 1974-75 state college budget hearings held in Harrisburg were the first to be oriented to degree programs. Funding decisions were based on degree program considerations rather than the traditional line item appropriations. This meant that funders for the first time were able to concentrate on the output producing programs of the insti-

tutions rather than the details of the operational aspects of the several campuses.

When asked what he did when one of Mansfield's degree program unit costs was significantly higher than the unit cost for a similar program on a sister campus, Dr. Miller replied, "I worry a lot." He indicated that in such situations explanations had to be provided and thus far the state has accepted that each campus has its areas of specialization and strength in which higher than average unit costs are to be expected. Dr. Miller states that, "on balance, Mansfield has found it extremely useful to compare program information with sister institutions."

RIDER COLLEGE

Staffing decisions at Rider College for the 1974-75 academic year will be based to a significant extent on productivity ratios and unit cost data that are direct derivatives of RRPM and the NCHEMS Information Exchange Procedures implementation. These decisions pertain not only to appointment of new faculty but also to the reassignment of personnel within academic departments. For example, when a faculty member from the English department leaves the institution it might be assumed that another faculty member will be hired to replace him. However, according to Dr. J. Barton Luedeke, Director of Planning and Analysis and Assistant to the President, "With RRPM we can look at the effect on productivity ratios and simulate the cost impact associated with leaving the faculty position vacant as well as filling it. Positions are left vacant only in departments where analysis of the induced course load matrix and enrollment analysis indicate that productivity ratios will remain at a reasonable level. Decisions concerning several budgets will be made in this way for the 1974-75 academic year."

As a result of its participation in the IEP project, Rider College has decided to develop a new chart of accounts based primarily on the NCHEMS Program Classification Structure (PCS). Dr. Luedeke states, "We organized the new structure along the lines of the PCS because it's a logical structure which we believe will give us the ability to

aggregate our data in almost every essential way to support the decision-making process. We also expect to eliminate many of the crossover procedures associated with the IEP process."

After analyzing the outputs of RRPM, Rider has decided to modify its internal budgeting process. Previously the president and vice-presidents would meet with each department chairperson to negotiate on a line item by line item basis. While this worked satisfactorily, the availability of RRPM suggested the possibility of giving the department chairpersons a set of departmental planning parameters to use in the construction of their budget requests. Budget determinations now are made on the basis of the parameters rather than on line items. This process requires much less time of the president and vice-presidents. It has the further advantage of helping the department heads and deans plan and manage in a more program/outcome oriented manner while giving them the flexibility to redistribute resources across line items when they believe it is appropriate to do so.

Rider College now is involved in collective bargaining and is using IEP data and RRPM to formulate contract proposals and respond to union proposals regarding faculty workloads, salaries, and fringe benefits. As Dr. Luedeke says, "RRPM has been extremely useful in translating union workload change proposals into dollar implications. We can clearly see the relationship between the variables and quickly determine the trade-offs involved."

Rider College staff believe that their participation in the IEP program has given them the ability to respond to whatever new statewide or federal reporting standards may be developed. Furthermore, they believe they are in a position to affect the direction and emphasis of new standards because of their detailed understanding of the implications associated with the use of alternative costing procedures.

GEORGIA INSTITUTE OF TECHNOLOGY

There has been concern at The Georgia Institute of Technology that the current methods of allocating funds to the public institutions in their state may not have sufficiently recognized the above average costs of the engineering and physical science programs offered by the Institute. Dr. Vernon Crawford, Vice-President for Academic Affairs, now has available the unit costs for The Georgia Institutue of Technology degree programs and is gathering comparable cost figures from similar programs on other campuses. He hopes that within a year a significant number of institutions with large engineering and physical science components will have implemented standard NCHEMS cost studies and made their data available for exchange. They will then have the information they need to establish with some validity the magnitude of the cost variations between the types of programs that predominate at their institution and the liberal arts and humanities programs that comprise a major portion of the offerings on many other campuses.

While Dr. Crawford is not approaching his analysis of unit costs with a foregone conclusion, he feels that it is in the best interest of The Institute to determine the extent to which one should expect engineering and physical science programs to incur higher than average costs per FTE student. Should it turn out that variations in the allocation of state funds to the several Georgia institutions historically have not recognized the amount of justifiable cost variations among different types of programs, Georgia Tech will be prepared to argue for adjustments

to the allocation procedures used by the Board of Regents in distributing the lump sum appropriation they receive from the state.

In the past, when Georgia Tech has argued for differential treatment due to differential costs, the Chancellor's Office and Board of Regents always have asked for evidence related to exactly how much unit cost variation actually exists and how much variation is justified. With better cost data and comparative information, The Institute may be more persuasive in the future. Their argument is simply that equity in funding does not result from treating all institutions and all types of programs alike. The problem is to establish how different the treatment should be. The Georgia Institute of Technology hopes to bring some clarity to what has been a very muddy and difficult problem through the use of standard unit cost information exchanged with other colleges and universities.

NEW MEXICO JUNIOR COLLEGE

In its in-depth presentation to the New Mexico Legislative Finance Committee, New Mexico Junior College utilized much of the program and discipline related data, including unit costs, that resulted from its participation in the NCHEMS Information Exchange Procedure field test. The presentation to the LFC was made by Finis L. Heidel, chairman of the MMJC Board. Following the presentation the chairman of the LFC said, "I wish that every board of higher education in the State had a Finis Heidel on it." John Shepherd, Vice-President for instruction, stated "there is no question that presentation of detailed data such as is produced from the RRPM using standard information exchange procedures offers a tremendous advantage over other means of presenting budget and program information." In 1974 NMJC obtained its requested appropriation and also caused the language of the 1963 junior college act to be changed to improve the possibility of the junior college receiving additional state aid as a result of presentations based on IEP information. NMJC expects to use this same process next year.

For New Mexico Junior College, which has had considerable experience in the use of planning models, one of the most useful components of IEP has been the Faculty Activity Analysis. In the fall of 1973, all faculty, in consultation with academic administrators, completed the NCHEMS Faculty Activity Analysis form. A synopsis of this information,

in addition to providing a means of distributing costs to appropriate activities, has been presented to the Board to show what faculty members actually are doing. According to Shepherd, "The Faculty Activity Analysis is an excellent measurement device for demonstrating that when you hire a faculty member you get much more than just a classroom teacher." Faculty spend their time on such other activities as unscheduled teaching, advising, student-oriented activities, curriculum development, community services, and so forth. As accreditation agencies continue to move toward outcome-oriented evaluation, Faculty Activity Analysis can be used as a means of demonstrating that faculty are spending their time in ways necessary to achieve the overall mission of the institution. For example, one of the goals of New Mexico Junior College is to provide community service activities. The results of the FAA show that faculty members are in fact spending significant time in this area. Likewise, other NMJC objectives such as academic advising of students (faculty-centered program) are addressed by the Faculty Activity Analysis.

Dr. Shepherd says, "One of the greatest benefits of the Faculty Activity Analysis is that it defines in the mind of each faculty member that he is more than just an instructor. In the past most faculty have failed to consider all the things they were doing. Now they see a new and larger role for themselves in instruction as well as in the management of the college." FAA points out strengths and weaknesses in the mode of operation of each faculty member. For example, if a faculty member

at NMJC reports that he spends little or no time advising students, it is likely that some changes in his mode of operation will be suggested.

It has been determined that a shift in student demand is occurring at NMJC away from the associate degree program toward the noncredit, continuing education activities and vocational-technical offerings. As a result of examination of variations in faculty productivity ratios a decision was made to shift one position from the social science field to automotive mechanics. According to Dr. Shepherd "Information provided in the IEP field test greatly assisted in reaching this decision."

New Mexico Junior College believes the use of tools such as RRPM and IEP provide significant new data to assist the decision-making processes.

Dr. Shepherd sums up his interest in these tools by stating, "Higher education is changing very rapidly. Simulation models and improved management information will help us maintain our early warning system so that we may spot potential difficulties before they become major problems."

UNIVERSITY OF NORTH DAKOTA

For several years the University of North Dakota has used faculty credit hour productivity ratios and cost per credit hour data in each discipline as a basis for allocating faculty positions to each department. However, until the NCHEMS standard procedures began to be employed on a few other campuses, the University of North Dakota was unable to obtain comparison figures from other institutions. Dr. W. E. Koenker, Vice-President for Academic Affairs, indicates that it has been very helpful to view, for the first time, comparable unit costs and productivity ratios for discrete disciplines from other similar campuses. He states, "the usefulness of the comparative data would have been much enhanced if there had been more participating schools similar to UND in size, mission, and financial support."

During the fall of 1973, UND developed tables displaying the credit hours produced per FTE teaching faculty and the direct cost per credit hour for each discipline at each course level at four institutions. In addition to UND, the institutions included in the tables were the University of New Mexico, the University of Northern Michigan, and the University of Wisconsin at LaCrosse. Examination of the comparative data tables led deans and department chairmen to the conclusion that certain changes in the allocation of faculty positions should occur.

The College of Engineering at UND has been experiencing declining enroll-

ments and on this basis a tentative decision had been reached to eliminate two existing faculty positions. However, after looking at the productivity ratios in engineering at other schools, UND decided that on a relative basis their engineering college was not overstaffed and consequently reversed the earlier decision. The two engineering faculty positions were not eliminated. Elsewhere in the institution the comparisons of unit costs and productivity ratios with other campuses had the opposite effect and some disciplines lost faculty positions.

Academic administrators at UND had been concerned for some time that their social science discipline costs were too low and that those disciplines were suffering from a lack of resources compared to other disciplines in the University. Cost data comparisons with the other three campuses showed that the disparity between social sciences and other disciplines at UND was very similar to that found on the other campuses. Thus, it was determined that social sciences are consistently low cost disciplines and perhaps should not be compared to dissimilar disciplines on a single campus.

The University has established a faculty committee to review all graduate level degree programs. This committee is using the standard unit cost data to identify graduate programs with high cost and low utilization. Once identified, the questionable programs will be analyzed in some detail and recommendations relative to the future of each program will be developed.

UNIVERSITY OF WISCONSIN--LACROSSE

The University of Wisconsin--LaCrosse's primary use of IEP data has been in its reporting and negotiating process with the central administration of the University of Wisconsin System. During the period from August to December, 1973, the master's level programs in the University of Wisconsin System were thoroughly reviewed. As a result of this review, conducted at the request of the Wisconsin State Legislature, each program on each campus was assigned to one of three categories on the basis of such factors as students enrolled, students graduated, and unit costs developed by UW Central Administration. Category I contained programs to be continued, Category II contained programs to be continued on probation for two years and Category III contained programs to be phased out. The University at LaCrosse was able to convince the Central Administration that LaCrosse's participation in IEP had produced more recent cost information than that used by the Central Administration. As a direct result of the availability of this cost data, LaCrosse was successful in its attempt to have the Master of Science degree in biology changed to Category I from Category III, to which it originally had been assigned.

The University of Wisconsin--LaCrosse sees a great advantage accruing to those who develop data using standard procedures such as IEP. Currently, University of Wisconsin--LaCrosse is compared in terms of costs with the other twelve state university campuses in Wisconsin based on the results

of an intra-Wisconsin costing methodology. According to Dr. David Witmer, Assistant Chancellor, "We are able to use the NCHEMS Information Exchange Procedures cost data to link our data with other like institutions outside the state and show that in many cases costs at all University of Wisconsin campuses are low in a given discipline or degree program. I'm looking forward to the time when all 2,000 senior institutions in the United States have similar data available so that more comparisons can be made."

The future at the University of Wisconsin--LaCrosse holds more uses of the IEP data set. For example, comparisons will be made by discipline between LaCrosse and other institutions which will be ranked in terms of generally agreed upon quality. Says Dr. Witmer, "If generally acknowledged high quality departments at other institutions have consistently low productivity ratios and high faculty salaries, and we have high productivity ratios and low salaries, then we must address the question as to whether we are in fact producing low quality outcomes for the sake of maintaining low costs. If so, what are we going to do about it?"

COUNTY COLLEGE OF MORRIS

"This year it was extremely helpful to have comparative cost data concerning other two-year colleges from around the country with similar educational programs when we made our budget presentation to our own Board of Trustees and ultimately to the Board of Chosen Freeholders of the County of Morris." This statement by Robert H. Sharpe, Dean of Administration, capsulizes the major use of initial standard cost study results at the County College of Morris in Dover, New Jersey. While New Jersey state support for the community colleges was not felt to be in jeopardy this year, the local tax funds for support of the college had to be gathered in a very competitive environment. The seven Freeholders of Morris County had to decide how education rated in value to the community relative to many other needed activities. Dean Sharpe said, "I think we have long had a reputation for squeezing the buffalo on every nickel several times before releasing him and for making effective use of our available resources, but the information developed from the NCHEMS packages has added a concrete dimension to our claims of efficiency."

The only unit costs that had been available previously at County College of Morris were average cost per student with no attention given to variations in costs among the several technical and transfer curricula being offered. This year, Dean Sharpe and his staff were able to construct unit cost tables that compared on a program by program basis

the annual cost per FTE student major among twelve community colleges from throughout the nation including the Morris County College. The college was able to show its own Trustees and the Freeholders that its costs were very much in line and that programs which were expensive at Morris County were equally expensive on other campuses. The school's budget presentation gained considerable credibility due to the use of the new information. Had it not been for the new data and consequent improved credibility of the budget presentation, school officials feel that the Board of Freeholders probably would have cut the college budget by approximately five percent or required that tuition be raised so increased costs could be passed on to the students. Dean Sharpe states, "No doubt we will continue to seek information that is peculiar to our institution and present it in different ways as the need arises. We have not destroyed that ability, but we have developed a meaningful foundation and have gone a long way in satisfying our particular Board's need for cost data."

Dr. James F. Gilsenan, Dean of Instruction, has stayed in close contact with the MIS development at County College of Morris. Dr. Gilsenan is leading the faculty toward the use of new comparative information for internal planning and resource allocation purposes. He feels it is imperative that faculty groups be able to clearly analyze why unit costs differ among disciplines and degree programs. Unit cost data are

only the point of beginning for planning for differences in the operating parameters among the organizational units on the campus. The Morris County faculty seem "honestly interested in learning more about management systems and the information that can be obtained from them." The faculty are aware that the new cost data have helped gain more local funds for the college budget than might have been the case. For this reason, the faculty increasingly are willing to learn about the comparative data and pursue improved planning and management practices.

UNIVERSITY OF NORTHERN COLORADO

The first major use of new management tools at the University of Northern Colorado was in development of the 1974-75 budget for presentation to state funders. RRPM 1.6 was the basic tool used and, although a program budget was not presented this year, the model was very helpful in developing the data for the traditional discipline-related budget. According to Dr. Duane Henderson, Director of Academic Research, the output from RRPM 1.6 was the basic support document for the budget presentations to the Colorado Commission on Higher Education, to the Executive Budget Office, and finally to the Joint Budget Committee of the Legislature. The University gained considerable credibility during these budget presentations due to its improved ability to support specific budgeted figures with hard data. When queried about specific budget items, the RRPM support data allowed the university administrators to describe exactly how the budget calculations and decisions had been developed.

President Richard R. Bond has begun to focus the internal planning process at UNC on degree programs as opposed to disciplines and departments. He sees this as an approach that can serve students better and emphasize planning and budgeting for outputs as opposed to inputs. The university hopes to move toward the presentation of a program budget to the State of Colorado in the future and thus promote the acquisition of resources on the basis of planned outputs in the form of educated people in various

fields of study.

Internally, the University of Northern Colorado has found comparisons of faculty credit hour productivity ratios among disciplines quite useful. As a result of such comparisons, changes in the internal staffing pattern have occurred. Some departments have benefited, while others have lost new faculty positions. Dr. Henderson states, "We are now able to spot both our strong and weak areas as never before. We now have concrete data rather than arbitrary assumptions as the basis for decision making."

A Department Contribution Report, showing how each discipline's credit hours and resources are supporting other departments' majors, was prepared and shared with the faculty. The result of this was an improved understanding of the interrelationships among the departments and how enrollments in one field of study affect multiple organizational units. For the first time the faculty had a "clear picture of where their energies were going."

President Bond has made substantial use of the new management information on his campus and emphasizes that if management systems are to be truly effective "it is absolutely essential that the chief administrative officer of the institution and the Vice-President for Academic Affairs be deeply involved and recognize the limitations as well as the

profitable applications of the data." He states, "The provision of these data does not substitute for professional judgments. These kinds of data do, however, provide a framework within which decisions can be made and can either validate judgments or can cause an administrator to check his judgment in the face of the data that he finds, recognizing that he may be making a decision which conflicts with the apparent decision dictated by the data."

UNIVERSITY OF NEW MEXICO

Two recent events indicate the ways in which the University of New Mexico is beginning to use data produced during the preliminary IEP field test. In January, 1974, the Board of Regents appointed a 15-member committee on University Planning chaired by the Vice-President for Research. This committee has had weekly meetings directed toward the development of a planning report for the University. Many of the unit costs, average faculty teaching loads and other data generated during the IEP pilot test have become the basis for much of the committee's work.

In addition, Dr. Chester Travelstead, Academic Vice President, reports that although New Mexico currently does not use differential funding formulas to determine the equitable distribution of state higher education operating funds among the public institutions, the University of New Mexico Board of Regents is using IEP types of data to promote such an approach. At its April 23 meeting the University of New Mexico Board of Regents passed the following resolution which has been presented to the New Mexico Board of Educational Finance and given wide publicity throughout the state. The resolution speaks for itself.

Resolution Concerning Differential Funding By Program and Level for New Mexico Institutions of Higher Education

WHEREAS data now available at the University of New Mexico and at other institutions of higher learning indicate wide variations in cost per student credit hour both by program and level (for example, at UNM it costs only $17 to produce one student credit hour in lower division Mathematics courses but $84 to produce one student credit hour in lower

division Nursing courses, and in Psychology it costs only $6 per student credit hour at the lower division level, but $18 at the upper division level, and $145 at the graduate level); and

WHEREAS the National Center for Higher Education Management Systems (NCHEMS) of the Western Interstate Commission for Higher Education (WICHE) has made important progress in providing a systematic information base of comparable data among institutions of higher education in New Mexico and other states; and

WHEREAS agencies responsible for statewide coordination of systems of higher education have in at least 50% of the states already adopted an approach to funding based upon differential costs by program and level; and

WHEREAS the Board of Educational Finance has repeatedly stated the desirability of transition to such a differential basis for funding, and has declared its intention to adopt a funding formula of this type as soon as practicable: Therefore be it

RESOLVED that the Regents of the University of New Mexico urge the Board of Educational Finance, in order to achieve greater equity in making its recommendations for funding, to proceed expeditiously to put into operation a system based upon differential costs by program and level, and that the Regents request administrative officials of the University to be of all possible assistance to the Board of Educational Finance and its staff in the installation of such a system.

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